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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/673,937	09/30/2003	Woo-Chan Jung	SEC.898D	1631
20987	7590	02/25/2005	EXAMINER	
VOLENTINE FRANCOS, & WHITT PLLC ONE FREEDOM SQUARE 11951 FREEDOM DRIVE SUITE 1260 RESTON, VA 20190			SOWARD, IDA M	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 02/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/673,937	Applicant(s) JUNG ET AL.	
	Examiner Ida M. Soward	Art Unit 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 29-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 29-31 is/are rejected.
- 7) ☒ Claim(s) 32 and 33 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09/800,892 & 10/122,272.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9-30-03 & 1-28-04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the application filed September 30, 2003.

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy, Republic of Korea 2000-32893, has been filed in parent Application No. 09/800,892, filed on 03/08/2001. The certified copy, Republic of Korea 2001-21067, has been filed in CIP Application No. 10/122,272, filed on 04/16/2002.

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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Claims 29-31 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Moore et al. (US 2001/0034129 A1).

In regard to claim 29, Moore et al. teach a semiconductor device structure 100 comprising: a substrate 112 having a gate electrode 126 formed at an upper portion of the substrate 112, a source and a drain 116 & 118 formed at a lower portion of both sides of the gate electrode 126; and an insulating layer 134 continuously formed on the substrate 112 and the gate electrode 126 (Figure 6, page 4, paragraphs [0044]-[0047]). Also, the insulating layer 134 was continuous before opening 162 was etched into the insulating layer 134.

In regard to claim 31, Moore et al. teach an etch stop layer 132 formed on the substrate 112 and underlying the insulating layer 134 (Figure 6, page 4, paragraphs [0045]-[0046]).

In regard to claims 29-30, the semiconductor device structure is structurally equivalent to the claimed semiconductor device structure. Therefore, "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). (See MPEP § 2113)

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moore et al. (US 2001/0034129 A1).

In regard to claim 29, Moore et al. teach a semiconductor device structure 100 comprising: a substrate 112 having a gate electrode 126 formed at an upper portion of the substrate 112, a source and a drain 116 & 118 formed at a lower portion of both sides of the gate electrode 126; and an insulating layer 134 continuously formed on the substrate 112 and the gate electrode 126 (Figure 6, page 4, paragraphs [0044]-[0047]). Also, the insulating layer 134 was continuous before opening 162 was etched into the insulating layer 134.

In regard to claim 31, Moore et al. teach an etch stop layer 132 formed on the substrate 112 and underlying the insulating layer 134 (Figure 6, page 4, paragraphs [0045]-[0046]).

However, Moore et al. fail to teach the insulating layer being formed by (a) flowing the oxidizing gas at the oxidizing gas flow rate, (b) flowing the first carrier gas at the first carrier gas flow rate while carrying a first impurity including boron flowing at a first impurity flow rate, (c) flowing the second carrier gas at the second carrier gas flow rate while carrying a second impurity including phosphorus flowing at a second impurity flow rate, and (d) flowing a silicon source material at a silicon source flow rate, wherein,

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for the insulating layer composition, a ratio of the oxidizing gas flow rate, the first carrier gas flow rate, the second carrier gas flow rate, the silicon source flow rate, the first impurity flow rate, and the second impurity flow rate is about 2.00 - 2.50 : 0.70 - 0.95 : 1 : 0.15 - 0.25 : 0.040 - 0.045 : 0.013 - 0.014, and wherein a flow rate of the second carrier gas is at least 4,000 sccm, wherein the oxidizing gas is one selected from a group consisting of oxygen gas, ozone gas and a mixture thereof, the first carrier gas is a nitrogen gas, the second carrier gas is a helium gas, the silicon source material is tetraethylorthosilicate (TEOS), the first impurity is one selected from a group consisting of triethylborate (TEB), trimethylborate (TMB), and a mixture thereof, and the second impurity is one selected from a group consisting of triethylphosphate (TEPO), trimethylphosphate (TMPO) and a mixture thereof.

In regard to claims 29-30, "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). (See MPEP § 2113)

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have recognized the interchangeability of the structurally equivalent semiconductor device as taught by Moore et al. to enhance the electrical performance. (See MPEP § 2183 (B))

Allowable Subject Matter

Claim 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 33 is objected to for being dependent on intervening claim 32, which has allowable subject matter.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not disclose, make obvious, or otherwise suggest the structure of the applicant's together with the other limitations of the independent claims. The dependent claim being further limiting and definite is also allowable.

The closest prior art of record includes Lien et al. (5,710,449) and Nulty et al. (US 2002/0146897 A1).

Lien et al. (5,710,449) teaches an insulating layer including an undoped insulating layer such as a glass, silicon dioxide, or silicon nitride layer and a BPSG (boron-phosphorus-silicon glass) layer interposed between an insulating layer 315 and a metal layer 340 (Figure 3E, columns 4-5, lines 61-64 and 54-65, respectively).

Nulty et al. (US 2002/0146897 A1) teach an undoped insulating layer 450 interposed between an etch stop layer 440 and photoresist 455 (Figure 4(H), pages 5-7, paragraphs [0048], [0062] and [0064], respectively).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of the art with respect to semiconductor device structures:

Goda et al. (US 6,828,624 B1)

Sasada et al. (5,936,300)

Yamanashi (5,468,986)

Yu (US 6,187,664 B1)

Yoshimi et al. (JP 04357879 A).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ida M. Soward whose telephone number is 571-272-1845. The examiner can normally be reached on Monday - Thursday 6:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

IMS

February 3, 2005

John M. Swartz
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